T09D01 – (9.2) Redox Equations

Name…….

1. 9.2.1 Deduce simple oxidation and reduction half-equations given the species involved in a redox reaction. (3)
   a. Using $Cr_2O_7^{2-}$ as an example, demonstrate the steps for writing the proper half-reaction for oxidation:
      i.
      ii.
      iii.
      iv.
      v.
      vi.
   b. Using HNO_2 as an example, demonstrate the steps for writing the proper half-reaction for reduction:
      i.
      ii.
      iii.
      iv.
      v.
      vi.

2. 9.2.2 Deduce redox equations using half equations. (3)
   a. If given both the reduction and oxidation half equations, you should be able to balance and simplify the equations. A common example is the oxidation of a primary or secondary alcohol (via dichromate or manganate). Following Topic 10 again, if the half-equations for the oxidation of methanol (and reduction of manganate)

$$2H_2O + CH_3OH \rightarrow CO_2 + H_2O + 6H^+ + 6e^-$$
$$MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$$

3. 9.2.3 Define the terms oxidizing agent and reducing agent. (1)

4. 9.2.4 Identify the oxidizing and reducing agents in redox equations. (2)

Reducing Agents (oxidized)		Oxidizing Agents (reduced)	
Hydrogen		**Oxygen**	
Carbon		**Ozone**	
Carbon Monoxide		**Chlorine**	
Metals		**Acidified $KMnO_4$**	
		Acidified $K_2Cr_2O_7$	
		Acidified H_2O_2	
		Metal Ions	
		Hydrogen Ions	
		MnO_2	

5. Often, chemical equations are difficult to balance based due to large and uneven numbers of reacting and produced species. A systematic approach using the principles of redox may allow you to balance such equations. Balance each of the following equations using this method:

   a. $Cu + HNO_3 \rightarrow Cu(NO_3)_2 + NO + H_2O$

   b. $HNO_3 + I_2 \rightarrow HIO_3 + NO_2 + H_2O$